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CATALOGUE OF FOSSILS

OCCURRING IN THE

CINCINNATI GROUP,

OF

OHIO, INDIANA & KENTUCKY.

By E. O. ULRICH.

CINCINNATI:
Printed by James Barclay, 269 Vine Street.
MDCCCLXXX.
1880

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HARVARD
UNIVERSITY

PREFACE.

In the following pages the author has attempted to catalogue all the species of fossils known to him from the Lower Silurian exposures in Ohio, Indiana and Kentucky. That many species occur in these strata which we have failed to chronicle is certain, but no labor has been spared to make the catalogue as complete as possible. The number of species by far exceeds that of any previous catalogue of the species of this section of Lower Silurian rocks. And the end is not yet, since the two score or more of energetic collectors about Cincinnati are continually increasing the list by frequent discoveries of new fossils. Of the species contained in this list, at least five hundred and fifty are represented in my cabinet, beside twenty-seven undetermined forms. Many of the new species recorded in the list, have as yet not been published. The names proposed for them in my manuscript (which will be published as soon as it is possible) have been given. A few species which were overlooked, and consequently will not be found in their proper places, have been placed at the end of the list.

The term Cincinnati Group, as used by me, will, I have no doubt, be found objectionable by many. Recent investigations, however, have induced me to retain the name in the sense proposed by Dr. J. S. Newberry, and have demonstrated that the question of the retention of that term, or the substitution of the names Trenton Limestone, Utica Slates aud Hudson River Group, is, to say the least, an open one. In the Cincinnati exposures it is an utter impossibility to mark a line of division between the Utica Slates and the Hudson River Group. There are a number of localities where a continuous section of the strata from low water mark in the Ohio river, to three hundred feet above that level, can be examined. These sections present no stratum that may be used or marked as a divisional one. The lithological characters of the lower members of this section fade gradually into those of the upper beds. On palæontological grounds we find still less reasons for a separation of the Cincinnati Group of rocks into minor groups. Here we have an extensive fauna belonging exclusively to the Cincinnati Group, since of the six hundred and sixty forms mentioned in this catalogue, nearly four hundred have not been recorded from any other formation. The remaining two hundred and seventy-five species occur in the Lower Silurian deposits of New York and Canada, and there range in time from the Chazy to the Clinton.

In the upper six hundred feet of the Cincinnati Group, we find represented as characteristic fossils, at least fifty undoubted Trenton species, none of which are found below two hun-

dred feet above low water mark in the Ohio river at Cincinnati. In fact, of the two hundred and seventy-five species common to other formations, nearly three fourths of that number would have a higher position in the Lower Silurian series of strata than is indicated by their range in New York and Canada. The difference of position of some of these species is remarkable, and to illustrate the assertion, a few may be mentioned. *Columnaria halli*, Nicholson (*Columnaria alveolata*, Hall), in New York is a Black river Limestone species, while in Ohio, Indiana, and Kentucky its range is above an horizon, equivalent to seven hundred feet above low water mark at Cincinnati. In New York, *Protarea vetusta, Streptorhynchus subtentus, Orthis subquadrata, Rhynchonella capax* and *dentata*, are truly Trenton species, while in the Cincinnati exposures not one has been found below the six hundred feet level.

Facts like these, showing the great intermingling of the species of the Hudson River Group, Trenton, Black River, and Birdseye Limestones, have made me doubt the propriety of identifying any subdivision of the Cincinnati Group with any of the Lower Silurian divisions of the East. As a provisional compromise, I have appended a column of ranges. The plan employed may be explained as follows: As is well known, the thickness of that portion of the Cincinnati Group, above low water mark in the Ohio River at Cincinnati, is about eight hundred feet. This thickness, for convenience sake, I have divided into eight equal parts, each comprising one hundred feet of strata. All species restricted to beds below the lowest of this series have been marked "below 0." For example, we may take *Leptobolus lepis*, Hall, range, 0—1, signifying, from lowest bed to one hundred feet above; *Columnaria alveolata*, Goldfuss, range, 7—8, *i. e.*, from seven hundred feet above the low water mark layer to eight hundred feet above the same stratum; *Orthis clytie*, Hall, range, below 0; this species is found at Frankfort, Ky., in lower strata than any exposed at Cincinnati. The range of each species, as given, must be looked upon as approximate, since I have no doubt that the majority of the limits will, in course of time, be materially changed. The column was mainly prepared for the convenience of collectors, and may be quite useful to them. All that is claimed, so far as the accuracy of the ranges is concerned, is, that the species either was found by me within the limits stated, or I have used the information received from good authority that certain species can be found at the given elevations in the series.

ROBERT T. JACKSON.

CATALOGUE

OF

CINCINNATI GROUP FOSSILS.

PLANTÆ.

Order ALGÆ.

Genus BUTHOTREPHIS, Hall.

	Range.
1. B. gracilis, Hall	0—8
2. B. gracilis, var. crassa, Hall	0—8
3. B. ramulosa, S. A. Miller	0—1
4. B. succulens, Hall	3—5

Genus PALÆOPHYCUS, Hall.

5. P. flexuosum, James	1—2
6. P. ornatum, Ulrich	3—6
7. P. sculptum, Ulrich	3—6
8. P. tubulare, Hall	2—6

Genus LICROPHYCUS, Billings.

9. L. flabellum, Miller & Dyer	3—6

Genus CHLŒPHYCUS, Miller & Dyer.

10. C. plumosum, Miller & Dyer	0—2

Genus ARISTOPHYCUS, Miller & Dyer.

11. A. ramosum, Miller & Dyer	3—5
12. A. ramosum, var. germanum, Miller & Dyer	3—5

Genus Trichophycus, Miller & Dyer.

	Range.
13. T. lanosum, Miller & Dyer	6—7
14. T. sulcatum, Miller & Dyer	0—2
14*a*. T. venosum, S. A. Miller	3—6

Genus Dactylophycus, Miller & Dyer.

15. D. quadripartitum, Miller & Dyer	0—2
16. D. tridigitatum, Miller & Dyer	0—2

Genus Heliophycus, Miller & Dyer.

17. H. stelliforme, Miller & Dyer	3—5

Genus Arthraria, Billings.

18. A. biclavata, S. A. Miller	0—6

Genus Saccophycus, James.

19. S. intortum, James	near 6?

Genus Lockeia, James.

20. L. siliquaria, James	0—1

Genus Rusophycus, Hall.

21. R. asperum, S. A. Miller	near 4
22. R. bilobatum, Hall	0—8
23. R. pudicum, Hall	2—8

Genus Blastophycus, Miller & Dyer.

24. B. diadematum, Miller & Dyer	near 4

Genus Conostichus, Lesquereux.

25. C. truncatus, Ulrich	4—5

Genus Dystactophycus, Miller & Dyer.

26. D. mammillanum, Miller & Dyer	4—7

Genus Scolithus, Haldeman.

27. S. linearis, Haldeman	?
28. S. tuberosus, Miller & Dyer	near 3

Genus DISCOPHYCUS, Walcott.

	Range.
29. D. typicalis, Walcott	near 3

Genus CYCLOPHYCUS, Ulrich.

30. C. laterale, Ulrich	near ½

Order EQUISETACEÆ.

Genus SPHENOPHYLLUM, Brongniart.

31. S. primævum, Lesquereux	1—4

Order LYCOPODIACEÆ.

Genus PROTOSTIGMA, Lesquereux.

32. P. sigillaroides, Lesquereux	2—6

PROTOZOA.

Order SPONGIDA.

Genus ASTYLOSPONGIA, Roemer.

33. A. globosa, Ulrich	5—7
34. A. tumida, James	near 3?

Genus MICROSPONGIA, Miller & Dyer.

35. M. gregaria, Miller & Dyer	3—7
36. M. irregularis, Ulrich	5—6

Genus EOSPONGIA, Billings.

37. E. (?) communis, Ulrich	near 6
38. E. turnerensis, Ulrich	near 6

Genus CALATHIUM, Billings.

38*a*. C. obliquum, Ulrich	near 8

Genus TRICHOLITES, Ulrich.

39. T. typicalis, Ulrich	near 4

Genus STREPTOSPONGIA, Ulrich.

	Range.
40. S. confusa, Ulrich	near 4
41. S. labyrinthica, Ulrich	7--8

Genus HETEROSPONGIA, Ulrich.

42. H. aspera, Ulrich	7—8
43. H. knotti, Ulrich	7--8
44. H. nodulosa, Ulrich	near 6
45. H. subramosa, Ulrich	4—8

Genus CYSTOSPONGIA, Ulrich.

46. C. tuberosa, Ulrich	7—8

Genus STROMATOCERIUM, Hall.

47. S. rugosum, Hall	below 0

Genus ERIDOSTROMA, Ulrich.

48. E. densa, Ulrich	0—½
49. E. (?) densissima, Ulrich	7—8

Genus CRATERIPORA, Ulrich.

50. C. erecta, Ulrich	3—5
51. C. lineata, Ulrich	1—4
52. C. lineata, var. expansa, Ulrich	0—5

Genus NULLIPORA, Lamark.

53. N. (?) crustulata, Ulrich	2—7

CŒLENTERATA.

ZOANTHARIA RUGOSA.

Family CYATHOPHYLLIDÆ.

Genus PALÆOPHYLLUM, Billings.

54. P. divaricans, Nicholson	6—7

Genus Streptelasma, Hall.

	Range.
55. S. corniculum, Hall	6—7
56. S. sessile, Ulrich	near 8

Genus Zaphrentis, Rafinesque.

57. Z. ohioensis, James	4—?

Family COLUMNARIDÆ.

Genus Columnaria, Goldfuss.

58. C. alveolata, Goldfuss	7—8
Syn.—*Favistella stellata*, Hall.	
59. C. halli, Nicholson	7—8
60. C. calicina, Nicholson	7—8
Syn.—*C. hertzeri*, Rominger.	

ZOANTHARIA PERFORATA.

Family FAVOSITIDÆ.

Genus Favosites, Lamark.

61. F. Gothlandica (?) Lamark*	?

Genus Alveolites, Lamark.

62. A. granulosus, James	5—7

Genus Columnopora, Nicholson.

63. C. cribriformis, Nicholson	7—8
Syn.—*Houghtonia huronica*, Rominger.	
64. C. parva, Ulrich	6—?

Family PROTAREIDÆ.

Genus Protarea, Edwards & Haime.

65. P. vetusta	5—8?
66. P. vetusta, var. verneuili, Edwards & Haime	6?

* That this species occurs in the Cincinnati Group is very doubtful.

Family BEATRICIDÆ.

Genus BEATRICEA, Billings.

	Range.
67. B. nodulosa, Billings	7—8
68. B. undulata, Billings	7—8
69. B. subplana, Ulrich	7—8
70. B. marionensis, Ulrich	7—8

ALCYONARIA.

Family GRAPTOLITIDÆ.

Genus GRAPTOLITHUS, Linnæus.

71. G. gracilis, Hall	0—2
72. G. tenuis (?) Portlock	0—1

Genus DENDROGRAPTUS, Hall.

73. D. tenuiramosus, Walcott	0—2
74. D. gracillimus, Lesquereux	0—3

Genus DICRANOGRAPTUS, Hall.

75. D. ramosus, Hall	0—½

Genus DIPLOGRAPTUS, Hall.

76. D. whitfieldi, Hall	0—½
77. D. spinulosus, Hall	0—½

Genus CLIMACOGRAPTUS, Hall.

78. C. typicalis, Hall	0—2
79. C. bicornis, Hall	0—4

Genus DICTYONEMA, Hall.

80. D. irregulare, Hall	near 2

Genus DICTYOGRAPTUS, Ulrich.

81. D. reticulatus, Ulrich	1—4

Genus INOCAULIS, Hall.

82. I. arbuscula, Ulrich	1—2

Genus MEGALOGRAPTUS, S. A. Miller.

	Range.
83. M. welchi, S. A. Miller	0—7

Family TETRADIIDÆ.

Genus TETRADIUM, Dana.

84. T. fibratum, Safford	7—8
85. T. minus, Safford	6—8
86. T. columnare, Hall	6—8
87. T. cellulosum, Hall	below 0

Syn.—*Phytopsis cellulosum*, Hall.

ECHINODERMATA.

CRINOIDEA.

Family CYATHOCRINIDÆ.

Genus GLYPTOCRINUS, Hall.

88. G. angularis, S. A. Miller	1—5
89. G. baeri, Meek	6—7
90. G. decadactylus, Hall	1—5
91. G. dyeri, Meek	3—7
92. G. dyeri, var. sublevis, S. A. Miller	3—4
93. G. fornshelli, S. A. Miller	6—7
94. G. onealli, Hall	6—7
95. G. parvus, Hall	3—5
96. G. shafferi, S. A. Miller	3—5
97. G. subglobosus, Meek	3—5
98. G. simplex, Wetherby	1—2
99. G. ulrichi, Wetherby	near 4

Genus HETEROCRINUS, Hall.

100. H. constrictus, Hall	3—5
101. H. constrictus, var. compactus, Meek	3—5
102. H. exilis, Hall	0—2
103. H. heterodactylus, Hall	0—5
104. H. heterodactylus, var	near 1

	Range.
105. H. juvenis, Hall	4—7
106. H. laxus, Hall	near 2?
107. H. simplex, Hall	0—5
108. H. simplex, var. grandis, Meek	0—5
109. H. tenuis, Billings	1—2

Sub-genus Iocrinus, Hall.

110. I. subcrassus, Meek & Worthen	1—7
111. I. geniculatus, Ulrich	0—½

Genus Anomalocrinus, Meek & Worthen.

112. A. incurvus, Meek & Worthen	3—6
113. A. caponiformis, Lyon	near 4

Genus Poteriocrinus, Miller.

Sub-genus Dendrocrinus, Hall.

114. D. caduceus, Hall	6—7
115. D. casei, Meek	5—7
116. D. cincinnatiensis, Meek	near 4
117. D. (?) curtus, Ulrich	0—1
118. D. dyeri, Meek	0—1
119. D. polydactylus, Shumard	6—7
120. D. posticus, Hall	5—7
121. D. covingtonensis, Wetherby	1—2

CYSTOIDEA.

Genus Lepocrinites, Conrad.

122. L. moorei, Meek	6—7

Genus Agelacrinites, Vanuxem.

123. A. cincinnatiensis, Roemer	3—6
124. A. holbrooki, James	near 6
125. A. pileus, Hall	3—6
126. A. septembrachiatus, Miller & Dyer	near 5
127. A. vorticellatus, Hall	3—6

Genus Hemicystites, Hall.

128. H. granulatus, Hall	3—5
129. H. stellatus, Hall	3—5

Genus Lichenocrinus, Hall.

	Range.
130. L. crateriformis, Hall	0—3
131. L. dyeri, Hall	1—6
132. L. tuberculatus, S. A. Miller	5—7
133. L. pattersoni, S. A. Miller	near ½?

Genus Cyclocystites, Billings & Salter.

134. C. bellulus, Miller & Dyer	?
135. C. magnus, Miller & Dyer	near 5
136. C. minus, Miller & Dyer	0—5
137. C. mundulus, Miller & Dyer	4—5
138. C. parvus, Miller & Dyer	near 5

Genus Microcystites, Ulrich.

139. M. globosus, Ulrich	near 4

ASTEROIDEA.

Genus Palæaster, Hall.

140. P. clarki, S. A. Miller	3—4
141. P. dyeri, Meek	near 3
142. P. finei, Ulrich	0—1
143. P. granulosus, Hall	3—4
144. P. harrisi, Miller	near 7
145. P. incomptus, Meek	near 3
146. P. jamesi, Dana	near 3?
147. P. longibrachiatus, S. A. Miller	near 6
148. P. shafferi, Hall	near 3?
149. P. simplex, S. A. Miller	3—6
150. P. spinulosus, Miller & Dyer	near 4

Genus Palæasterina, McCoy.

151. P. approximata, Miller & Dyer	6—7
152. P. speciosa, Miller & Dyer	near 7

Genus Stenaster, Billings.

153. S. grandis, Meek	near 7

OPHIUROIDEA.

Genus Protasterina, Ulrich.

	Range.
154. P. granuliferus, Meek	1—5
155. P. fimbriata, Ulrich	near 1
156. P. flexuosa, Miller & Dyer	0—2

MOLLUSCOIDA.

BRYOZOA.

Family ESCHARIDÆ.

Genus Ptilodictya, Lonsdale.

157. P. acuminata, James	0—2
158. P. bergenensis, Ulrich	below 0
159. P. elegantula (?), Hall	?
160. P. fenestelliformis, Nicholson	?
161. P. falciformis, Nicholson	2—6
162. P. flagellum, Nicholson	6—7
163. P. flexuosa, James	1—2
164. P. granulosa, James	1—2
165. P. hilli, James	?
166. P. latirama, Ulrich	below 0
167. P. parallela, James	1—2
168. P. perelegans, Ulrich	6—7

Sub-genus Heterodictya, Nicholson.

169. H. flabella, Ulrich	below 0
170. H. maculata, Ulrich	3—6
171. H. magnifica, S. A. Miller	near 7
172. H. nodosa, James	near 6
173. H. pavonia, D'Orbigny	3—5
Syn.—*Chætetes clathratulus*, James. *Cyclopora jamesi*, Prout.	
174. H. plumaria, James	near 7
175. H. ponderosa, Ulrich	0—½

Genus Artrhopora, Ulrich.

Range.

176. A. emacerata, Nicholson ..... 2—3
177. A. fragilis, Billings ..... ½—4
178. A. nitidula, Billings ..... 3—5
Syn.—*Ptilodictya internodia*, Miller & Dyer.
179. A. shafferi, Meek ..... 1—6

Genus Arthroclema, Billings.

180. A. (?) tenuis, James ..... 0—4

Genus Intricaria, DeFrance.

181. I. (?) clathrata, Miller & Dyer .....near 3

Family TUBULIPORIDÆ.

Genus Ceramopora, Hall.

181. C. alternata, James ..... 1—2
Syn.—*C. concentrica*, James.
182. C. (?) beani, James ..... 6—7
183. C. distincta, Ulrich ..... 1—2
184. C. (?) irregularis, James ..... 1—7
185. C. marginata, Ulrich .....near 4
186. C. multipora, James ..... 1—5
187. C. nicholsoni, James ..... 4—5
188. C. ohioensis, Nicholson ..... 1—8
189. C. radiata, James ..... 2—5
190. C. utricula, Ulrich ..... 5—6
191. C. whitei, James ..... 3—5

Genus Fistulipora, McCoy.

192. F. flabellata, Ulrich .....near 4
193. F. robusta, Ulrich .....near 2
194. F. siluriana, James ..... 3—4

Genus Stellipora, Hall.

195. S. antheloidea, Hall ..... 3—6
196. S. antheloidea, var. plana, Ulrich ..... 3—4
197. S. limitaris, Ulrich .....near 7

Genus Callopora, Hall.

198. C. cincinnatiensis, Ulrich .....near 2
199. C. (?) milfordensis, James .....near 2

Genus Chætetes, Fischer.

	Range.
200. C. approximatus, Nicholson	2—3½
201. C. astrictus, Ulrich	near 4
202. C. briareus, Nicholson	below 0—½
203. C. calceolus, Miller & Dyer	near 4
204. C. calyculus, James	0—½
205. C. cincinnatiensis, James	near 4
206. C. clavacoideus, James	near 4
207. C. clavis, Ulrich	0—2
208. C. compressus, Ulrich	4—5
209. C. crustulatus, James	1—6
210. C. dalei (?), Edwards & Haime	3—4
211. C. delicatulus, Nicholson	6—7½
212. C. elegans, Ulrich	3—4
213. C. discoideus, James	3—6
214. C. expatiatus, Ulrich	3—7
215. C. fletcheri, Edwards & Haime	0—7
216. C. filiasa (?), D'Orbigny	3—7
217. C. frondosus, D'Orbigny	0—6
218. C. frondosus, var. decipiens, Rominger	3—5
219. C. gracilis, James	near 4
220. C. granuliferus, Ulrich	below 0
221. C. implicatus, Ulrich	1—2
222. C. irregularis, Ulrich	near 4½
223. C. jamesi, Nicholson	1—2
224. C. lycopodites, Vanuxem	3—8
225. C. lateralis, Ulrich	1—2
226. C. mammulatus, D'Orbigny	3—6
227. C. meeki, James	6—8
228. C. newberryi, Nicholson	1—2?
229. C. nicklesi, Ulrich	near 4
230. C. nodulosus, Nicholson	6—7½
231. C. onealli, James	0—2
232. C. onealli, var. sigillaroides, Nicholson	0—2
233. C. papillatus, Mc Coy	3—6
234. C. petechialis, Nicholson	3—5
235. C. petropolitanus (?), Pander	0—2
236. C. pulchellus (?) Edwards & Haime	near 1
237. C. quadratus, Rominger	6—8
238. C. (?) raripandus, Ulrich	0—½
239. C. rugosus, Hall (not Edwards & Haime)	1—2
240. C. rectus, Ulrich	near 7
241. C. (?) (Atactopora) simulans, Ulrich	3—4
242. C. subglobosus, Ulrich	1—2
243. C. subrotundus, James	near 7
244. C. subpulchellus, Nicholson	3—4
245. C. subquadratus, Ulrich	near 7

Range.

246. C. tuberculatus, Edwards & Haime..... 2—6
247. C. venustus, Ulrich.....near 1
248. C. whiteavesi, Nicholson.....below 0—4

Sub-genus Dekayia, Edwards & Haime.

249. D. aspera, Edwards & Haime..... 3—4
250. D. aspera, var. attrita, Nicholson..... 3—5
251. D. appressa, Ulrich .....near 3½
252. D. minuta, Ulrich..... 3—5
253. D. obscura, Ulrich..... 1—4
253*a*. D. pusulata, Ulrich.....near 3

Genus Atactopora, Ulrich.

254. A. hirsuta, Ulrich..... 1—2
255. A. maculata, Ulrich..... 1—4
256. A. multigranosa, Ulrich..... 4—5
257. A. mundula, Ulrich .....near 4
258. A. ortoni, Nicholson .....near 4
259. A. septosa, Ulrich.....near 3
260. A. subramosa, Ulrich ..... 6—7
261. A. tenella, Ulrich.....near 4

Genus Bythopora, Miller & Dyer.

262. B. arctipora, Nicholson .....near 1
263. B. dendrina, James ..... 3—4
Syn.—*B. fruticosa*, Miller & Dyer.
264. B. meeki, James..... ?
265. B. parvula, James .....near 2
266. B. (?) (Chætetes) minuta, James.....near 5?
267. B. tenuichorda, Ulrich .....near 2

Genus Chonopora, Ulrich.

268. C. papillata, James .....near 4
269. C. lichenoides, James ..... 4—7
270. C. scabra, James ..... 1—7

Family CRISIIDÆ.

Genus Hippothoa, Lamouroux.

271. H. delicatula, James .....near 4
272. H. inflata, Hall ..... 3—7

Genus Ropalonaria, Ulrich.

273. R. venosa, Ulrich .....near 7

Genus Stomatopora, Bronn.

	Range.
274. S. arachnoidea, Hall	1—6
275. S. arachnoidea, var. auloporoides, Nicholson	2—6
276. S. confusa, Nicholson	0—2
277. S. frondosa, James	3—7
278. S. (?) nexilis, James	?

Family RETEPORIDÆ.

Genus Retepora, Lamark.

279. R. angulata(?), Hall	2—?

BRACHIOPODA.

Family ORTHIDÆ.

Genus Orthis, Dalman.

280. O. aequivalvis, Hall	3—4
281. O. bellula, James	3—4
282. O. biforata, Schlotheim	
283. O. biforata, var. lynx, Von Buch	3—7
284. O. biforata, var. acuminata, James	3—4
285. O. biforata, var. acutilirata, James	3—4
286. O. biforata, var. dentata, Pander	3—5
287. O. biforata, var. cypha, James	5—7
288. O. biforata, var. inflata, James	5—7
289. O. biforata, var. laticostata, James	3—5
290. O. biforata, var. profundo-sulcata, Owen	?
291. O. borealis, Billings	below 0
292. O. clytie, Hall	below 0
293. O. *costata*, Hall. Name preoccupied. May be called O. pumila, Ulrich	?
294. O. crassa, James	3—6
295. O. electra(?), Billings	3—4
296. O. ella, Hall	3—4
297. O. emacerata, Hall	4—5
298. O. meeki, S. A. Miller	4—5
299. O. fissicosta, Hall	6—7
300. O. insculpta, Hall	6—7
301. O. jamesi, Hall	3—5
302. O. merope, Billings	3—4

	Range.
303. O. morrowensis, James	3—5
304. O. multisecta, James	0—4
305. O. multisecta, var. cyclus, James	near 1
306. O. neglecta, James	?
307. O. orthambonites, Pander	3—4
308. O. occidentalis, Hall	4—7
309. O. occidentalis, var. sinuata, Hall	3—7
310. O. pectinella, Conrad	below 0
311. O. pectinella, var. semiovalis, Hall	3—4
312. O. plicatella, Hall	3—5
313. O. retrorsa, Salter	near 6
314. O. subquadrata, Hall	5—7
315. O. testudinaria(?), Dalman	
316. O. testudinaria, var. jugosa, James	5—7
317. O. (Zygospira?) sectostriata, Ulrich	3—5
318. O. tricenaria, Conrad	below 0
319. O. triplicatella, Meek	3—4

Family RHYNCHONELLIDÆ.

Genus Rhynchonella, Fischer.

320. R. capax, Conrad	5—7½
321. R. capax, var. perlamellosa, Whitfield	6—7
322. R. dentata, Hall	6—7

Family SPIRIFERIDÆ.

Genus Trematospira, Hall.

323. T. granulifera, Meek	?
324. T.(?) quadriplicata, S. A. Miller	below 0
325. T. similis, Ulrich	near 4

Genus Zygospira, Hall.

326. Z. cincinnatiensis, James	2—4
327. Z. concentrica, Ulrich	near 3.5
328. Z. headi, Billings	6—7
329. Z. modesta, Say	through
330. Z. modesta, var. kentuckyensis	6—7

Family STROPHOMENIDÆ.

Genus Strophomena, Rafinesque.

331. S. alternata, Conrad	2—7
332. S. alternata, var. alternistriata, Hall	?6

	Range.
333. S. alternata, var. loxorhytis, Meek	3—5
334. S. alternata, var. nasuta, Conrad	near 4
335. S. declivis, James	
336. S. fracta, Meek	2—4
337. S. rhomboidalis, Wilckens	5—8
338. S. rhomboidalis, var. gibbosa, James	near ½
339. S. squamula, James	1—4
340. S. tenuilineata, Conrad	?
341. S. ulrichi, James	½—2

Genus Streptorhynchus, King.

342. S. elongatus, James	6—7
343. S. hallianus, S. A. Miller	1—2
344. S. neglectus, James	6—7
345. S. nutans, James	6—7
346. S. planoconvexus, Hall	near 3
347. S. sinuatus, Emmons	3—5
348. S. subtentus, Conrad	6—7
349. S. subtentus, var. planumbonus, Hall	6—7
350. S. sulcatus, Verneuil	6—7
351. S. vetustus, James	6—7

Genus Leptæna, Dalman.

352. L. plicatella, Ulrich	0—1
353. L. sericea, Sowerby	through
354. L. sericea, var. aspera, James	1—2

Family CRANIIDÆ.

Genus Crania, Retzius.

355. C. alternata, James	above 6
356. C. asperula, James	above 6
357. C. costata, James	above 6
358. C. dyeri, S. A. Miller	below 2
359. C. laelia, Hall	2—7
360. C. multipunctata, S. A. Miller	1—4
361. C. parallela, Ulrich	1—2
362. C. percarinata, Ulrich	1—2
363. C. reticularis, S. A. Miller	above 6
364. C. scabiosa, Hall	1—7
365. C. socialis, Ulrich	1—?

Genus Schizocrania, Hall & Whitfield.

366. S. filosa, Hall	0—5

Genus Pholidops, Hall.

	Range.
367. P. cincinnatiensis, Hall	1—5

Family DISCINIDÆ.

Genus Discina, Lamark.

368. D. pelopea(?), Billings	1—2
369. D.(?) punctata, Ulrich	1—2
370. D. sublamellosa, Ulrich	1—2
371. D. tenuistriata, Ulrich	1—2

Genus Trematis, Sharpe.

372. T. crassipuncta, Ulrich	3—4
373. T. dyeri, S. A. Miller	3—4
374. T. magna, Ulrich	below 0
375. T. millepunctata, Hall	2—7
376. T. punctostriata, Hall	2—5
377. T. terminalis, Conrad	4?
378. T. quincuncialis, Miller & Dyer	near 6

Family LINGULIDÆ.

Genus Lingula, Bruguiere.

379. L. belliformis, Ulrich	0—1
380. L. bisulcata, Ulrich	1—2
381. L. cobourgensis, Billings	below 0—2
Syn.—*L. covingtonensis*, Hall & Whitfield.	
382. L. daphne, Billings	3—4
Syn.—*L. attenuata*, Hall (non Sowerby.)	
383. L. modesta, Ulrich	below 0
384. L. norwoodi, James.	?
385. L. quadrata, Eichwald	below 0
386. L. riciniformis, Hall	below 0—4
387. L. vanhornei, S. A. Miller	4—6

Genus Lingulella, Salter.

388. L. cincinnatiensis, Hall & Whitfield	3—5

Genus Leptobolus, Hall.

389. L. elongatus	0—½
390. L. insignis, Hall	0—1
390*a*. L. lepis, Hall	0—1

MOLLUSCA.

GASTEROPODA.

Family MURICIDÆ.

Genus Fusispira, Hall.

	Range.
391. F. subfusiformis, Hall	near 1
392. F. terebriformis, Hall	?

Family PYRAMIDELLIDÆ.

Genus Subulites, Conrad.

393. S. acceptus, Ulrich	below 0

Family BELLEROPHONTIDÆ.

Genus Bellerophon, Montfort.

394. B. bilobatus, Sowerby	through
395. B. capax, Ulrich	near 2
396. B. mohri, S. A. Miller	near 6
397. B. morrowensis, Miller & Dyer	4—7

Genus Bucania, Hall.

398. B. expansa, Hall	6—7
399. B. bidorsata, Hall	1—2
400. B. costata, James	near 4

Geuus Carinaropsis, Hall.

401. C. patelliformis, Hall	0—5

Genus Cyrtolites, Conrad.

402. C. carinatus, S. A, Miller	0—2
403. C. compressus, Conrad	near 4
404. C. dyeri, Hall	4—7
405. C. elegans, S. A. Miller	6—7
406. C. magnus, S. A. Miller	near 5
407. C. nitidulus, Ulrich	0—½
408. C. ornatus, Conrad	1—7

Genus Microceras, Hall.

	Range.
409. M. inornatum, Hall	0—7
410. M. minutissimum, Ulrich	3—5

Family PLEUROTOMARIIDÆ.

Genus Pleurotomaria, DeFrance.

411. P. ambigua, Hall	near 2
412. P. dryope(?), Billings. (P. carinata, James)	?
413. P. halli, S. A. Miller	3—4
414. P. ohioensis, James	0—2
415. P. subconica, Hall	3—8
416. P. subtilistriata, Hall	1—2
417. P. tropidophora, Meek	near 2
418. P. calphurnia(?), Billings	near 4

Genus Murchisonia, D'Archiac.

419. M. angustata, Hall	?
420. M. augustina, Billings	3—5
421. M. bellicincta, Hall	3—7
422. M. decurta, Hall	1—2
423. M. gracilis, Hall	1—3
424. M. perangulata, Hall	near 1
425. M. milleri, Hall	1—4
426. M. multigruma, S. A. Miller	5—8
427. M. simulatrix, Billings	near 8
428. M. sumnerensis, Safford	3—7
429. M. uniangulata, Hall	near 3½

Genus Trochonema, Salter.

430. T. umbilicatum, Hall	below 0—8

Genus Raphistoma, Hall.

431. R. lenticulare, Conrad	0—8
432. R. planistria, Hall	6—8

Family SOLARIDÆ.

Genus Ophileta, Vanuxem.

433. O. levata(?), Vanuxem	below 0

Family TURBINIDÆ.

Genus Cyclora, Hall.

	Range.
434. C. depressa, Ulrich	0—6
435. C. hoffmani, S. A. Miller	
436. C. minuta, Hall	0—8
437. C. parvula, Hall	0—8

Genus Holopea, Hall.

438. H. (Cyclonema?) minor, James	3—5
439. H. obliqua, Hall	near 3
440. H. paludinaformis, Hall	near 3

Genus Cyclonema, Hall.

441. C. bilix, Hall	3—8
442. C. conicum, S. A. Miller	6—7
443. C. fluctuatum, James	6—7
444. C. montrealense, Billings	near 3
445. C. percarinatum, Hall	0—½
446. C. phaedra, Billings	3—5
447. C. pyramidatum, James	3—7
448. C. transversum, Ulrich	near 3
449. C. varicosum, Hall	near 4

PTEROPODA.

Family CONULARIDÆ.

Genus Conularia, Miller.

450. C. formosa, Miller & Dyer	1—6
451. C. quadrata, Walcott	below 0
452. C. trentonenis, Hall	below 0—½

Family HYOLITHIDÆ.

Genus Hyolithes, Eichwald.

453. H. americanus, Billings	0—7

CEPHALOPODA.

Family ORTHOCERATIDÆ.

Genus Orthoceras, Breynius.

	Range.
454. O. annellum, Conrad	near 4
455. O. amplicameratum, Hall	near 1
456. O. carleyi, Hall & Whitfield	near 3
457. O. cincinnatiensis, S. A. Miller	
458. O. fosteri, S. A. Miller	6—7
Syn. *O. duseri*, Hall & Whitfield	
459. O. byrnesi, S. A. Miller	?
460. O. dyeri, S. A. Miller	?
461. O. halli, S. A. Miller	6—7
462. O. harperi, S. A. Miller	3—?
463. O. mohri, S. A. Miller	6—8
464. O. junceum, Hall	0—2
465. O. ortoni, Meek	2—?
466. O. transversum, S. A. Miller	0—3
467. O. turbidum, Hall & Whitfield	3—5

Genus Ormoceras, Hall.

468. O. tenuifilum, Hall	below 0

Genus Endoceras, Hall.

469. E. annulatum, Hall	?
470. E. approximatum, Hall	?
471. E. magniventrum, Hall	0—2
472. E. proteiforme, Hall	0—7?
473. E. subcentrale, Hall	?

Family GOMPHOCERATIDÆ.

Genus Gomphoceras, Sowerby.

474. G. eos, Hall & Whitfield	near 7
475. G. acceptum, Ulrich	3—4

Family PHRAGMOCERATIDÆ.

Genus PHRAGMOCERAS, Broderip.

	Range.
476. P. hector (?), Billings	?

Family LITUITIDÆ.

Genus TROCHOLITES, Conrad.

477. T. ammonius, Conrad	1—?
478. T. circularis, Miller & Dyer	near 5
479. T. minusculus, Miller & Dyer	below 2

Family TROCHOCERATIDÆ.

Genus TROCHOCERAS, Barrande.

480. T. baeri, Meek & Worthen	6—7

Family CYRTOCERATIDÆ.

Genus CYRTOCERAS, Goldfuss.

481. C. amœnum, S. A. Miller	near 7
482. C. magister, S. A. Miller	near 2
483. C. ventricosum, S. A. Miller	near 2
484. C. vallandighami, S. A. Miller	near 4

LAMELLIBRANCHIATA.

Family AMBONYCHIIDÆ.

Genus AMBONYCHIA, Hall.

485. A. bellistriata, Hall	0—2
486. A. (?) casei, Meek & Worthen	6—7½
487. A. costata, James	3—6
488. A. obtusa, Hall	?
489. A. radiata, Hall	1—7
490. A. retrorsa, S. A. Miller	2—4

Genus Anomalodonta, S. A. Miller.

	Range.
491. A. gigantea, S. A. Miller	6—7½
492. A. alata, Meek	3—5

Genus Angellum, S. A. Miller.

493. A. cuneatum, S. A. Miller	6—7

Family ARCIDÆ.

Genus Megambonia, Hall.

494. M. jamesi, Meek	3—5

Genus Tellinomya, Hall.

495. T. cincinnatiensis, Hall	?
496. T. cingulata, Ulrich	7—8
497. T. gibbosa, Hall	?
498. T. hilli, S. A. Miller	5—7
499. T. levata, Hall	1—8
500. T. obliqua, Hall	0—8?
501. T. nasuta, Hall	0—½
502. T. pectunculoides, Hall	3—5

Family NUCULIDÆ.

Genus Nucultes, Conrad.

503. N. yoldiaformis, Ulrich	1—2

Family TRIGONIDÆ.

Genus Lyrodesma, Conrad.

504. L. cincinnatiensis, Hall	1—5
505. L. planum, Conrad	1—3
506. L. postriatum, Emmons	0—2

Family CYPRINIDÆ.

Genus Cycloconcha, S. A. Miller.

507. C. mediocardinalis, S. A. Miller	1—3

Genus Cypricardites, Conrad.

508. C. dorsatus, Ulrich. Proposed instead of C. carinatus, Meek, which was preoccupied	2—4

	Range.
509. C. hainesi, S. A. Miller	6—8
510. C. hindi, Billings	?
511. C. quadrangularis, Whitfield	near 6
512. C. sterlingensis, Meek & Worthen	6—7½
513. C. subtruncatus, Hall	below 0
514. C. ventricosus, Hall	below 0

Genus Cleidophorus, Hall.

515. C. ellipticus, Ulrich	1—2
516. C. fabulus, Hall	0—7?
517. C. major, Ulrich	near 4
518. C. planulatus, Conrad	1—2
519. C. subellipticus, Ulrich	near 4

Family ANATINIDÆ.

Genus Cuneamya, Hall & Whitfield.

520. C. ampla, Ulrich	0—4
521. C. curta, Whitfield	4—6
522. C. contracta, Ulrich	near 4
523. C. inflata, Ulrich	3—5
524. C. (Sedgwickia?) neglecta, Meek	1—7
525. C. miamiensis, Hall & Whitfield	6—7
526. C. scapha, Hall and Whitfield	3—7
527. C. subcurta, Ulrich	3—4

Genus Sedgwickia, McCoy.

528. S. (?) compresssa, Meek	3—4
529. S. (?) divaricata, Hall and Whitfield	near 6?
530. S. (?) fragilis, Meek	3—4
531. S. (?) lunulata, Whitfield	4—6

Family PTERINIIDÆ.

Genus Pterinea, Goldfuss.

532. P. bellilineata, Billings	5—8
Syn.—*P. corrugata*, James.	
533. P. demissa, Conrad	3—8
534. P. insueta, Conrad	3—6
535. P. mucronata, Ulrich	1—2
536. P. welchi, James	near 5

Family MYTILIIDÆ.

Genus ANODONTOPSIS, McCoy.

	Range.
537. A. (?) milleri, Meek	6—7
538. A. (?) (Modiolopsis?) unionoides, Meek	3—4

Genus MODIOLOPSIS, Hall.

539. M. anodontoides, Conrad	near ½
540. M. cincinnatiensis, Hall & Whitfield	0—1
541. M. concentrica, Hall & Whitfield	3—7
541*a*. M. cuneiformis, James	near 5
542. M. curta, Hall	3—7
543. M. faba, Conrad	0—3
544. M. modiolaris, Conrad	1—7
545. M. modioliformis, Meek & Worthen	near ½
546. M. nasuta, Conrad	near 4
547. M. pholadiformis, Foster & Whitney	5—7
548. M. terminalis, Hall	near 4
549. M. truncata, Hall	3—6
550. M. versaillesensis, S. A. Miller	6—7

Family ORTHONOTIDÆ.

Genus ORTHONOTA, Conrad.

551. O. pholadis, Conrad	3—6

Genus ORTHODESMA, Hall & Whitfield.

552. O. cancellatum, Ulrich	1—2
553. O. contractum, Hall	3—6
554. O. curvatum, Hall & Whitfield	3—6
555. O. mickelboroughi, Whitfield	near 6?
556. O. parallelum, Hall	2—6
557. O. rectum, Hall & Whitfield	4—6
558. O. subovale, Ulrich	4—6
559. O. intermedium, Ulrich	3—4

Family CARDIOMORPHIDÆ.

Genus CARDIOMORPHA, DeKoninck.

560. C. obliquata, Meek	near 6

ARTICULATA.

ANNELIDA.

Order ERRANTIA.

Genus PROTOSCOLEX, Ulrich.

	Range.
561. P. covingtonensis, Ulrich	near 1
562. P. ornatus, Ulrich	near 1
563. P. simplex, Ulrich	near 1
564. P. tenuis, Ulrich	near 1
565. P. (?) flaccidus, Ulrich	near 1½

Genus EOTROPHONIA, Ulrich.

566. E. setigera, Ulrich	near 1

Genus WALCOTTIA, Miller & Dyer.

567. W. cookana, Miller & Dyer	near 4
568. W. rugosa, Miller & Dyer	2—4

Genus NEREIDAVUS, Grinnell.

569. N. varians, Grinnell	1—7

Genus EUNICITES, Ehlers.

570. E. simplex, Hinde	near 3
571. E. paucidens, Ulrich	near 3
572. E. subcontortus, Ulrich	near 3

Genus OENONITES, Ehlers.

573. O. longidens, Ulrich	near 3

Genus LUMBRICONERCITES, Ehlers.

574. L. dactylodus, Hinde	near 3
575. L. excavatus, Ulrich	near 3

Genus ARABELLITES, Hinde.

576. A. lunatus, Hinde	near 3

Range.

577. A. minor, Ulrich ..... near 3
578. A. parallelus, Ulrich ..... near 3
579. A. quadratus, Hinde ..... near 3
580. A. tridentatus, Ulrich ..... near 3

Order TUBICOLA.

Genus CONCHICOLITES, Nicholson.

581. C. corrugatus, Nicholson ..... 3—6
582. C. flexuosus, Hall ..... 0—6
583. C. minor, Nicholson ..... 3—6

Genus SPIRORBIS, Lamark.

584. S. cincinnatiensis, Miller & Dyer ..... near 4?
585. S. lovelandensis, James ..... ?

Genus SERPULITES, McLeay.

586. S. dissolutus, Billings ..... 0—4

Genus TENTACULITES, Schlotheim.

587. T. richmondensis, S. A. Miller ..... 6—7
588. T. sterlingensis, Meek & Worthen ..... ½—2
589. T. tenuistriatus, Meek & Worthen ..... ½—2

CRUSTACEA.

Family ACIDASPIDÆ.

Genus ACIDASPIS, Murchison.

590. A. cincinnatiensis, Meek ..... 1—6?
591. A. anchoralis, S. A. Miller ..... near 4
592. A. crossota, Locke ..... near 1
593. A. onealli, S. A. Miller ..... near 6
594. A. trentonensis, Hall ..... ½—2

Family CERAURIDÆ.

Genus CERAURUS, Green.

595. C. icarus, Billings ..... 6—7

Range.

596. C. perforator (?), Billings ..... ?
597. C. pleurexanthemus, Green ..... 3—7

Family PARADOXIDÆ.

Genus Triarthrus, Green.

598. T. becki, Green ..... 0—1

Family CALYMENIDÆ.

Genus Calymene, Brongniart.

599. C. callicephala (senaria), Green .....0—7½
600. C. christyi, Hall ..... 6—7

Family PRŒTIDÆ.

Genus Prœtus, Steininger.

601. P. parviusculus, Hall..... .....near 4
602. P. (?) spurlocki, Meek..... 1—2

Family PHACOPIDÆ.

Genus Dalmanites, Emmerick.

603. D. achates, Billings .....near 2
604. D. breviceps, Hall.....near 6
605. D. callicephalus, Hall ..... 2—4
606. D. carleyi, Meek..... 3—5

Family LICHASIDÆ.

Genus Lichas, Dalman.

607. L. trentonensis (?), Conrad.....near 4
608. L. harrisi, S. A. Miller..... ..... 4—7

Family TRINUCLEIDÆ.

Genus Trinucleus, Lhwyd.

609. T. bellulus, Ulrich.....0—1½
610. T. concentricus, Eaton ..... 0—2

Family ASAPHIDÆ.

Genus Asaphus, Brongniart.

	Range.
611. A. gigas, Dekay	0—7½
612. A. megistos, Locke	0—7½

Order OSTRACODA.

Genus Beyrichia, McCoy.

613. B. chambersi, S. A. Miller	0—7
614. B. ciliata, Emmons	1—3
615. B. duryi, S. A. Miller	near 4
616. B. elongata, Ulrich	near 8
617. B. oculifera, Hall	4—5
618. B. regularis, Emmons	6—7
619. B. persulcata, Ulrich	1—2
620. B. richardsoni, S. A. Miller	6—7

Genus Primitia, Jones.

621. P. bipartia, Ulrich	near 8
622. P. bivertex, Ulrich	0—1
623. P. byrnesi, S. A. Miller	0—1
624. P. cincinnatiensis, S. A. Miller	0—2
625. P. crepiformis, Ulrich	1—2
626. P. logani, Jones	7½—8
627. P. striatomarginata, S. A. Miller	7½—8

Genus Leperditia, Ronault.

628. L. glabra, Ulrich	7—8
629. L. josephana, Jones	below (?) 0
630. L. radiata, Ulrich	0—1
631. L. tumida, Ulrich	below 0

Genus Isochilina, Jones.

632. I. ampla, Ulrich	below (?) 0
633. I. approximata, Ulrich	near 8
634. I. gibbosa, Ulrich	below 0
635. I. latimarginata (?), Ulrich	below (?) 0
636. I. (?) minutissima, Hall	0—8

Genus Cytheropsis, McCoy.

637. C. cylindrica, Hall	below 0—8
638. C. unicornis, Ulrich	0—1

Genus Cythere, Muller.

	Range.
639. C. cincinnatiensis, Meek	near 4
640. C. irregularis, S. A. Miller	near 4

INCERTA SEDES.

Genus Anomaloides, Ulrich.

641. A. reticulatus, Ulrich	near 3

Genus Lepidolites, Ulrich.

642. L. dickhauti, Ulrich	near 1½
643. L. elongatus, Ulrich	near 1½

Genus Plumulites, Barrande.

644. P. jamesi, Hall & Whitfield	0—?
645. P. (?) dubius, Ulrich	3—4

Genus Pasceolus, Billings.

646. P. claudi, S. A. Miller	3—5
647. P. darwini, S. A. Miller	3—5
648. P. globosus, Billings	0—6

PISCES (?).

MARSIPOBRANCHII (?).

Genus Depranodus, Pander.

649. D. subrectus, Ulrich	0—¾
650. D. sulcatus, Ulrich	0—¾

Genus Prioniodus, Pander.

651. P. disparilis, Ulrich	near 4

ADDENDA.

Genus Chætetes, Fischer.

	Range.
652. C. aequalis, Ulrich	near 1
653. C. concavus, Ulrich	near 4
654. C. ramosus, D'Orbigny	3—6
655. C. varians, James	6—7

Genus Streptorhynchus, King.

656 S. filitextus, Hall.....near 7

Genus Brachiospongia, Marsh.

	Range.
52*a*. B. digitata, Owen	below (?) 0
52*b*. B. rœmerana, Marsh	below (?) 0
52*c*. B. lyoni, Marsh	below (?) 0
52*d*. B. tuberculata, James	near 7?

Genus Enoploura, Wetherby.

612*a*. E. balanoides, Meek	3—7½

Genus Orthoceras, Breynius.

462*a*. O. hindei, James	1—2
462*b*. O. meeki, Miller	?

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